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Willem Janszoon Blaeu. 1571-1638

WILLEM JANSZOON BLAEU

1571–1638

A SKETCH OF HIS LIFE AND WORK

WITH AN ESPECIAL REFERENCE TO HIS

LARGE WORLD MAP OF 1605

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NEW YORK

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Printer's mark of the Blaeu Press [tail-piece, page 59].

WILLEM JANSZOON BLAEU

1571–1638

WILLEM JANSZOON BLAEU
AND HIS
WORLD MAP OF 1605

WILLEM JANSZOON BLAEU, one of Holland's most distinguished map and globe makers of the early seventeenth century, was born at the village of Alkmaar in the year 1571; such is the record which finds general acceptance.[1]

Of his childhood nothing is known. It was some time in his early boyhood days that he went to Amsterdam, where he found employment, it appears at first, in the house of a Holland merchant, and later as a joiner's apprentice. We can be certain neither of the time when he decided to leave Amsterdam, nor of the circumstances which induced him to visit the island of Hveen, then belonging to Denmark,[2] an event of much significance in his life. We, however, cannot be far wrong in asserting the promptings for this visit to have been his early liking for mathematical, geographical and astronomical studies. On this island he was

1 An exhaustive study of the life and work of Willem Janszoon Blaeu does not exist. One of great value and interest is that by Baudet, P. J. H. *Leven en werken van Willem Jansz. Blaeu, uitgegeven door het Provincial Utrechtsch genootschap van kunsten en wetenschappen. Utrecht, 1871.*

The author acknowledges here his indebtedness to Baudet's work for invaluable aid in the preparation of this brief biography.

2 See illustration, p. 12. This, it will be noted, is a map signed "Insula Hvaena sive Venusia à Gviljelmo Blaev cum sum Tychone Astronomiae operam daret delineata."

brought into intimate relations with Tycho Brahe, the famous Danish astronomer, who, in 1576, established here his observatory at the Castle of Uranienburg.[3] For near a quarter of a century, this was one of the most famous centers in all Europe for the study of astronomical science and of its practical applications. Blaeu, let it be noted, was not the first of the young Netherlanders who found his way to Uranienburg that he might receive astronomical instructions from the great master. As early as 1591, Jacob Florent van Langren of Amsterdam sent his son Arnold to the Danish astronomer with a request that he might be allowed to copy the catalogue of the stars which had been located at his observatory, wishing to make use of the same in the new celestial globes which he proposed to construct. This special request, we are informed, was not granted, for Brahe's records were not yet complete, but young van Langren was given permission to see the large celestial globe which was in the observatory, and on which at the time of the visit 800 stars had been represented.[4] It is

[3] See illustration, p. 30.

August 8, 1576, the corner-stone of the Castle of Uranienburg was laid with much ceremony, and the completion of the building was made possible through the generous contributions and patronage of Frederick II of Denmark. See, for a brief description, Wolf: *Geschichte der Astronomie, München, 1877, p. 277;* Picard, J. *Voyage d'Uranibourg, ou observations astronomiques faites en Dannemarck. (Mem. de l'Acad. royale des sciences depuis 1666 jusque à 1699, tom. VII, p. 197*); Blaeu: *Atlas Major, vol. I, pp. 61–101.* Twelve illustrations of the Island of Hveen, and of the observatory of Uranienburg, with brief description, may here be found. These illustrations, it appears, were taken from Brahe: *Astronomiae instauratae mechanica. 1598.*

[4] This great copper globe, which Picard describes as having a diameter of 4 feet 7 inches and 1 line, constructed in Augsburg under the direction of Paul Hainzel, appears to have been sent to Uranienburg about 1584. In the course of succeeding years more than one thousand stars were represented on its surface according to the observations of Tycho Brahe. In 1597 the great astronomer left Denmark to find a home in Prague, taking with him his astronomical instruments, including his celestial globe. After Brahe's death in 1601, these instruments were purchased by Rudolph II, but on the capture of the City of Prague in 1623 by the Danish Prince

Island of Hveen, showing the location of Uranienburg. From Le Grand Atlas

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stated that Tycho often had as many as ten or twelve boys at his observatory as his assistants.

We have but little direct information concerning Blaeu's sojourn at Uranienburg. It appears certain that he passed at least two years with Brahe, engaged the while in study and in the construction of mathematical and astronomical instruments. May 21, 1596, the day of the young Hollander's departure for his native land, Brahe made the following entry in his day-book, which book may be found in the Imperial Library of Vienna, "Abiit domum in Hollandiam, Vilhelmus Batavius cum per integram hyemen his fuisset," and by Gassendi we are told that Guilielmus Janssonius had been with Tycho for two years, although he does not make it certain that it was for two consecutive years. That the relations between the two distinguished scientists continued to be of the most friendly character long after the date given above is very certain, as not a few of those who in later years in praising Blaeu's scientific attainments refer to him as "the pupil and longtime friend of Brahe," yet neither of them appears in his writings to have made more than a passing allusion to their relations.[5]

It cannot be doubted that Blaeu owed to his abode on the island of Hveen the real foundation of his scientific knowledge, both in the field of geography and of astronomy, as well as his knowledge of the construction and the skilful use of mathematical instruments. We have reason for believing that a number of the instruments which served the great astronomer in his investigations, were the

Ulrich the globe with other objects of interest was taken to Copenhagen. Here it remained until 1728, when it was destroyed by fire together with the castle in which it had so long been kept.

[5] John Blaeu, son of Willem, tells us that in 1591 his father was amanuensis of Tycho Brahe. See Blaeu: *Atlas Major, 1662, vol. I, p. 63.*

work of Blaeu, and it is an interesting fact, as we know, that Brahe's observations, here made, formed the basis for Kepler's calculations, leading him to the discovery of the laws which immortalized his name.

It was perhaps late in the year 1596, or early in 1597, that Blaeu returned to Amsterdam where he soon established himself as a maker of mathematical instruments, of maps and of globes, and as an engraver and printer.

Before the close of the seventeenth century, the Netherlands had moved into the first rank of European states in which the art of engraving and of printing flourished. Nothing perhaps contributed more to this end, especially in the north, than the freedom which there prevailed untrammeled by the restraints of the Index.

As for the particular art of map engraving and map printing, the work of Mercator, of Ortelius, of Waghenaer, had centered the attention of those interested in this field upon the Low Countries. As early as 1541, not to mention his work of the preceding decade, Mercator issued his terrestrial globe gores, which mark a decided advance in the art of map engraving, and this was followed by his large map of England, of Europe, and of the World, the latter setting forth the new method of projection since known as Mercator's projection. Ortelius's great work of 1570, with its numerous succeeding issues, Waghenaer's Mirror of Navigation of 1585, and Mercator's book of maps of 1585, for which collection as a title the name Atlas was first used, were superior productions, models for those who followed closely within the same field.

Blaeu acknowledged these men to be his masters, though, as was also frequently the case with other map makers and map engravers of his day, he occasionally forgot to assign

proper credit to those from whom he borrowed in the cartographical work that issued from his press.

We are told that Tycho had given to Blaeu a copy of his astronomical observations before their publication, that this copy was carried to Amsterdam, and that on the record contained therein the latter began the practice of globe making. The implication contained in this reference is that his first work as a globe maker was the preparation of material for a celestial globe, but no such globe of his is known bearing date earlier than 1602. His first dated work appears to have been a terrestrial globe of the year 1599. It was as a maker and vender of mathematical instruments, as a collector and close student of maps geographical and astronomical, he probably found his chief employment during the first years after his return to the Netherlands. There is good reason for thinking that from the first he prospered in his undertakings, and that he was soon in a position to establish an independent business. It may be inferred from incidental references that it was not long after 1600 he was in his own fully equipped house engaged in the business of engraving and printing.

Blaeu seems not to have become a member of any of the guilds in his adopted city, and we, therefore, cannot turn to their records for any information concerning his activities. His name first publicly appears in the records of the States General for the year 1605, in a resolution proposing that a sum of money should be granted to him for printing and publishing a NIEUW GRAETBOUCK, a name given at that time in the Netherlands to a book containing declination tables. This resolution reads as follows: "19 Maart 1605. Is Willem Jansz Blaeu tot Amsterdam geaccordeert octroy, omme voor den tyt van 6 jaren naestcomende

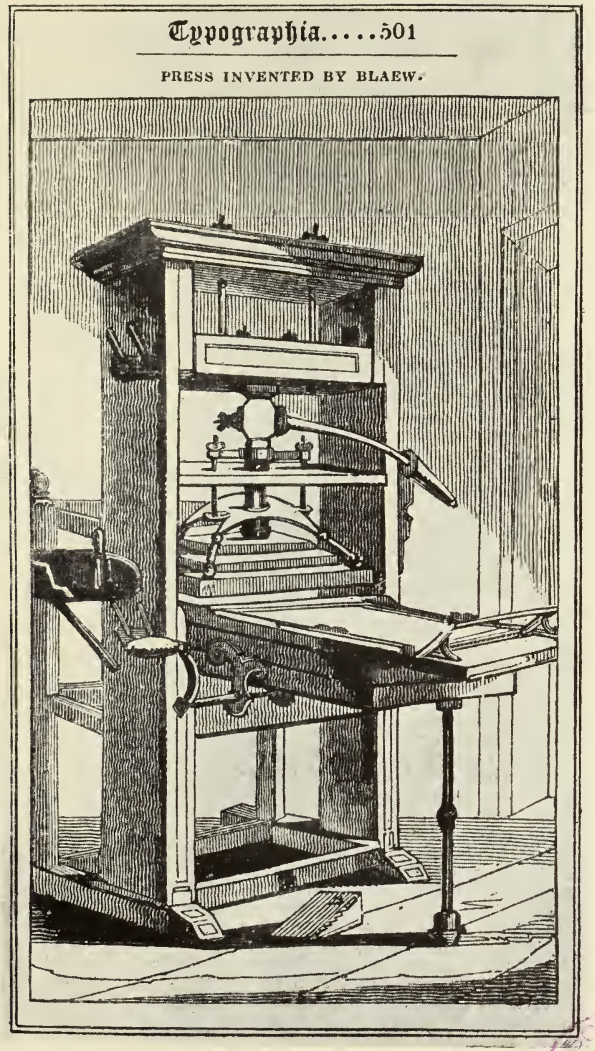
alleene in de vereenichde provincien in druck vuyt to geven een bouxken, geintituleert: Nieuw graetbouck, nae den ouden styl vuyt de aldercorrecste observatien van den vermaerden astronomo Tycho Brahe, gecalculeert ende gestelt op ten meridiaen deser Nederlanden, enz."[6] A copy of this work does not appear to be extant, but we may be able, as Baudet suggests, to obtain something of an idea of its character from later publications of Blaeu, as for instance from his "Licht der Zeevaert."

On his "Paescarte," one of his early publications, and usually referred to the year 1606, we read that it was "Ghedruckt t' Amsterdam bij Willem Janssoon op't Waeter inde Sonnewijser," a location often referred to in certain later publications as "op' t water In de vergulde Sonnewyser," reference being to the gilded sun-dial which as a business sign adorned the gable of his establishment.[7] It appears that in this originally selected locality his work was carried on until the year 1637, when his entire plant was moved into more commodious quarters in the Blumengracht, one year only before his death. On the death of Willem Blaeu, in 1638, the business passed into the hands of his sons John and Cornelius Blaeu. In 1672 practically the entire establishment was destroyed by fire.

For his ability and attainments as a practical printer Willem Blaeu is especially entitled to great honor. He

[6] Given by Baudet, *p. 154.*

[7] On the title-page of many of the books published by Blaeu, as on many of the maps which he issued, appears the expression "Sub signo solarii deaurati." Most of the works printed by Blaeu before 1619 have as his printer's device a balance with a terrestrial globe in the right scale and a celestial globe in the left, the latter being represented as the heavier and having the word "Praestat" printed below it. In certain later publications this mark was replaced by an armillary sphere, at the left of which is an allegorical figure representing Time and on the right a figure representing Hercules with the inscription "Indefessus agendo." See p. 59.



From Johnson, J. Typographia

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labored on for many years in Amsterdam, making use of such presses as were commonly to be found in the printing houses of his own and of other lands. Finding, however, numerous inconveniences attending the structure of these oldtime presses, he was induced, about 1620, to contrive remedies.[8] In this, we are told, he succeeded beyond his expectations, so much indeed that he had nine of the new presses constructed, each of which he called by the name of one of the Muses. The excellence of Blaeu's improvements soon becoming known to other printing houses, their proprietors were induced to follow his example, and presses of his design became, in the course of a few years, almost general throughout the Low Countries, and were introduced into England, though at first there was here much opposition to his new ideas. While the description below is that of the Blaeu establishment as it was under the management of the son John, yet as it presents to us the printing house founded by the father, Willem Blaeu, and describes a printing house of the middle of the seventeenth century, it is here cited in free translation.

"On the Blumengracht," says Filips von Zesen, in his description of the city of Amsterdam,[9] "near the third bridge, and the third alley, may be found the greatly renowned printing house of John Blaeu, Counsellor and Magistrate, of this city. It is furnished with nine type presses, named after the nine Muses, six presses for copperplate printing, and a type foundry. The entire establish-

[8] See, for brief descriptions of Blaeu's press, Stower, C. *Printer's Grammar. London, 1808, pp. 303–304;* Hansard, *Typography: an historical sketch of the origin and progress of the art of printing. London, 1825, p. 550;* and especially Johnson, J., *Typographia, or the Printer's Instructor. London, 1824, vol. II, pp. 500–551.* It is from this last named work that illustration p. 16 is taken.

[9] Filips von Zesen: *Beschreibung der Stadt Amsterdam, 1664, pp. 215–216.*

ment on the canal, with the adjoining house, in which the proprietor lives, is 75 feet in breadth, and stretches along the east side of a cross street 135 feet, or with the attached house 150 feet. Fronting on the canal is a room with cases in which the copper plates are kept, from which the Atlases, the Book of the Cities of the Netherlands and of foreign countries, also the Mariners' Atlases and other choice books are printed, and which must have cost a ton of gold. Next to this first room is a press room used for plate printing, and opening upon the cross street referred to above is a place where the type, from which impressions have been made, are washed; then follows in order the room for book printing, which resembles a long hall with numerous windows on either side. In the extreme rear is a room in which the type and certain other materials used in printing are stored. Opposite this store room is a stairway leading to a small room above which is set apart for the use of the proof-readers, where first and second impressions are carefully looked over, and the errors corrected which have been made by the typesetters. In front of this last designated room is a long table or bench on which the final prints are placed as soon as they are brought from the press, and where they are left for a considerable time. In the story above is a table for the same purpose just indicated, at the extreme end of which, and over the room occupied by the proof-readers, is the type foundry wherein the letters used in the printing of the various languages are moulded.

The foundation of this splendid building was laid in the year 1636, by John Blaeu's oldest son Willem Blaeu,[10] and on the 13th of the fall month of the following year the

[10] John Blaeu's oldest son Willem was at this time about one year old. If the statement by Zesen is correct, it perhaps points us to an interesting exhibition of parental pride.

printing establishment was here set in order. The original founder of the printing house, who died in the following year, was John Blaeu's art loving father Willem, who, for a considerable time, had been a pupil of the great astronomer Tycho Brahe, whom he zealously followed, constructing many instruments for the advancement of astronomical studies, for the promotion of the art of navigation, and of other sciences of like character, an interest in all of which he revived and furthered while at the same time he made new discoveries, as has become widely known from the publications which have issued from this printing house.

But why should we here give to them such unbounded praise? Since father and son without eulogy from us are so well known to the entire learned world, to which they have presented such treasures of inestimable value through their incomparable pains and at great cost, and are so far advanced on the road to immortality, it is more becoming in us to remain silent than to speak further concerning them."

Before turning for a reference more in detail to the publications which were issued by the Blaeu press, to a consideration of Willem Blaeu's most important work as engraver, as globe maker, as printer and publisher of maps and navigators' charts, a further brief word may be said touching certain general interests and activities of his, touching certain personal relations and individual characteristics, which support the conclusion that he was a man justly held in the highest esteem by men of science of his day, and that he was interested in whatever pertained to his great field of study.

Reference has been made to Blaeu's ability as a maker of mathematical and astronomical instruments, which work claimed more or less of his attention to the end of his days.

The fact, however, is a very remarkable one that from the many years of activity as an instrument maker with Tycho Brahe, and independently at Amsterdam, but one example of his should have come down to us. Vossius says that "no other scholar ever deserved so much praise as Blaeu on account of an extraordinary and beautiful quadrant, which can be seen at Leyden in the tower, where astronomical observations are being made."[11] His reference is to a quadrant now kept in the Leyden Observatory. It is described by Kayser in his Annals of the Observatory as a wooden quadrant, with a brass rim, having a radius of seven feet.[12] In the year 1632 it was purchased from the estate of Willebrod Snellius, and may be said to have induced the founding of this observatory in the year 1633.

With the conscientious map makers the problem was ever present, how shall accuracy in space relations, accuracy in location of places on the map be attained. Ptolemy had been a guide in the earlier years of great geographical discoveries and explorations, but geographical knowledge soon extended to regions beyond those known to Ptolemy, and the inaccuracies of his records, even for those regions more or less familiar to the ancients, became very apparent. In the maps of the seventeenth century we have interestingly exhibited the tortuous advance of geographical knowledge. They do not show a steady and continuous progress toward accuracy. Information which may have been accepted as truth respecting certain regions or geographical areas, and have been recorded as such by one or by many of the map makers, would often be held as doubtful by those of succeeding years, to be accepted and rejected again in turn. Blaeu's intimate acquaintance

[11] See Baudet, *p. 15.*

[12] See Baudet, *p. 14.*

with mathematics and astronomy as related to geography, particularly as related to cartography, admirably fitted him for a certain leadership in this field. We have from Vossius the information that Blaeu undertook the measurement of a degree on the surface of the earth to the end that he might aid the map maker in improving his work and serve especially the cause of navigation. In his attempts to find a new and better method for terrestrial measurements, it seems probable that he anticipated the work of the great mathematician Snellius, whose results were first published in the year 1617, and to whom credit is generally given for having employed a new method of procedure based upon triangulation.[13] Blaeu's measurements, made along the coast of the Netherlands from the mouth of the Meuse to the Texel, were never published, probably for the reason, as suggested by Vossius, that he may have distrusted their accuracy. The mathematician Picard, in his Voyage d'Uranibourg,[14] writes in the month of July, 1671, a brief word concerning Blaeu's contributions toward the solution of problems having to do with terrestrial measurements, giving us in this word practically the only information we have concerning the matter. According to Picard, Blaeu's measurements gave results with an error of but 66 meters, whereas for the same measurements, Snellius's results gave an error of no less than 3880 meters. Had Blaeu more persistently carried on his studies in this particular branch of mathematical geography, his name doubtless would have been with the very first in a list of those who have made contribution to the science of

[13] The report of this survey may be found in Snellius, W. *Eratosthenes Batavus, de terrae ambitus vera quantitate, a Willebrordi Snellio suscitatus. Lugd. Batav., 1617.*

[14] Picard, J. *Ouvrages de mathematique. A la Haye, chez P. Gosse et J. Neaulme, 1731.*

terrestrial measurement and to a reform of the maps. His aim was set in the right direction, and we are safe in saying that none, in his day, made greater contribution toward the attainment of accuracy in map drawing than did he. To be able to understand the nature of the errors so common in chart making and to be able to correct the same were two very different matters, and although Blaeu was able to point out many errors, such, for example, as pertained to latitude and longitude, his maps do not indicate that he was able to overcome all difficulties. His was not the day for scientifically accurate results. Years had yet to pass before that end could be attained. To some of his errors, and to certain improvements of his, attention will be directed later. He appears to have been especially desirous, at all times, of acquiring detailed geographical and astronomical information from navigators who visited distant regions, making request of them that their observations should be reported to him. In a letter to W. Schickard, dated June 24, 1634, Blaeu wrote, "When the directors of the East India Company placed me at the head of their department of hydrography a year ago, I requested them to charge all pilots and masters who sailed for India to observe all eclipses, in whatever part they might be seen, and this has been done."[15] His desire to be of assistance to others in giving out such information as might come into his possession is made evident by the further word in his letter to Schickard assuring him that "if observations of eclipses from India or other places on the way are sent to me, I shall be pleased to inform you of them."

The determination of longitude, particularly at sea, remained for more than a century and a half after Blaeu's

[15] This letter is quoted by Baudet, *pp. 172–174.*

day a most perplexing problem, a problem, however, of the greatest significance in the art of navigation, miscalculations being often the cause of most serious disasters. The rulers of the maritime states of western Europe not infrequently offered liberal reward for its solution. Philip III of Spain, for instance, promised an annuity of 6000 ducats to the one who would first devise a method for determining longitude.[16] Numerous attempts were made in Spain and Portugal, as a result of the promised reward, but the problem remained unsolved. The States General of Holland, for instance, offered a liberal reward to Plancius should a plan he submitted prove to be of value, which plan he had based upon the declination of the needle; and in the records of that body, bearing date May 21, 1601, we read that a reward of 150 pounds was promised to any one who, having made an expedition for the purpose of determining longitude and latitude, could obtain the support of six or eight sea captains that his method was of real value.[17] Blaeu often figured somewhat conspicuously as an expert in passing upon the solution of certain problems which were offered. Resolutions of the States General, for example, make mention of a plan submitted by Thomas Leamer, an Englishman residing in Amsterdam, but it appears that no satisfactory agreement could be entered into with him on his first plans, and it was, therefore, decided to submit his subsequent propositions to the College of Admiralty of Amsterdam, authorizing this body to ask for a demonstration of the new invention in its presence, to have it investigated by Willem Jansz. Blaeu and other masters

[16] See Lelewel, J. *Geographie du Moyen Age, Bruxelles, 1852–1857, vol. II, p. 194.*

[17] See De Jonge, J. K. J. *De opkomst van het Nederlandsch gezag in Oost-Indie, 1862–1909, vol. I, pp. 88–89.*

in this art together with such experienced navigators and pilots as the College might see fit to choose, to examine it carefully and impartially with especial reference to its practical value, and to follow their best judgment as to the advisability of attempting to make use of the invention.[18] On July 3, 1612, the Council of the Admiralty sent word to the States General that the aforesaid Leamer had been examined, in accord with the letter of December 21, 1611, at different times, and at his request again and again in its presence, by "Willem Jansz," and by many other persons experienced in mathematics and navigation, in order to find out the truth relative to his proposition; that they had charged the judges to examine honestly, and that it had been unanimously concluded the invention was wholly worthless.[19] It is not without interest to note that Leamer made an especial appeal to the Admiralty of Amsterdam, charging the committee with partiality and with inability to judge the case, but we are not informed that the Admiralty altered its opinion.

Taking into consideration the extensive commerce and interest in navigation of the United Provinces in this period, it does not occasion surprise that Galileo, after having offered in vain to Philip III his plan for a new method of determining longitude, should decide to present the same to the States General of the Provinces.[20] This plan he based upon his discovery in 1610 of the satellites of Jupiter and the valuable data furnished him through a study of

[18] See Baudet, *p. 18.*

[19] See Baudet, *pp. 18–19.*

[20] Reference to Galileo and his attempts to solve the problems relative to the determination of longitude may be found in Kästner, A. G. *Geschichte der Mathematik, 1796, vol. IV, p. 207;* Galileo Galilei: *Opere, III, p. 142;* Baudet, *pp. 131–145.*

the eclipses of these satellites. Galileo himself tells us of his negotiations with Philip of Spain, stating that the King informed him of the many inventions which had been sent to him, and which he had accepted, only to find afterward that they were of no practical value. Having been so often deceived, he had come to the conclusion that a great deal of money had been wasted, and had, therefore, decided to be more careful in future. It was not until August, 1636, that Galileo decided upon presenting his plan to the States General, as he informed Hugo Grotius, then Swedish consul at the French Court, and not until November of that year that Laurens Reael handed to the States a letter from him containing an explanation of his method, with an offer of the plan to that distinguished body. Blaeu is again chosen as one of four experts to examine and report on the invention. Galileo's plan was well adapted for the determination of longitude on land, but because of the ship's motion on the high seas it did not prove to be practical for navigators, though he suggested the placing of his instruments and the observer in a vessel of water on the ship's deck, thinking thus to counterbalance the ship's motion. By resolution of April 25, 1637, he was to receive a reward for the new method he had suggested, but it does not appear that it was paid to him.

Blaeu's training admirably fitted him to serve his country in matters pertaining to its maritime interests, and its calls as well as its rewards for his services were not infrequent. As further proof of the confidence that his contemporaries had in his knowledge of geography and navigation, the States General of Amsterdam, January 3, 1633, by resolution appointed Blaeu map maker of the Republic, an honorable position held by him until his

death, being then successively passed on to his son and to his grandson. In a resolution of October 23, 1666, we read that no house engaged in commerce will be allowed to send any marine maps to India, or have them taken by captains of vessels, except those made by Blaeu; and in a resolution of 1670 it is stated that to Willem Jansz. Blaeu, map maker in ordinary of the Company, instruction has been given to examine the journals of the pilots and to correct and improve the maps.

It is not easy at this date to determine the justice of the several complaints which we find were occasionally made by certain map makers of the Netherlands in the early seventeenth century against fellow countrymen. There was so much borrowing one from the other without credit that it would be an exceedingly difficult, if not impossible, task to give a complete catalogue of any one of the several map makers' work. Rivalry often ran strong, and the authorities not infrequently were urged to exercise special diligence to prevent the infringement of a copyrighted plate, or one that was protected, as they at that time expressed it, by an octroi. Between Willem Blaeu and Joannes Janssonius this rivalry was particularly marked, each claiming at times an infringement by the other. Whether it was for protection against Janssonius that Blaeu in 1608 presented a special plea to the States of Holland and West Friesland, asking that he be made secure against the loss caused by pirated editions of works published by him, is not certain. He informed the States that he had given himself hope of being able to support his family in an honest way, and that he would have succeeded with God's mercy and blessing, if certain individuals engaged in the same business had not undertaken to copy his

new works, as well as his enlarged and improved works.[21] This rivalry between Blaeu and Janssonius continued for many years, involving in some degree Jodocus Hondius, the father-in-law of Janssonius. It seems probable that Blaeu's complaint of 1608 touched in some manner his large World Map of 1605, since, as before stated, there is a striking resemblance between this and the World Map of Hondius issued about 1611, on which he must have been at work for some years, a similarity in which the very differences and slight variations cannot be without peculiar significance.[22]

If Blaeu won deserved renown through his scientific attainments, so the Blaeu press became renowned for the excellence of the work which bore its imprint. Its map engravers were among the most skilful employed in the workshops of the Netherlands, its types were unexcelled in simple but artistic form, unless perchance one may accord first place to the Elzevir press. His good work, as we know, was a spur to others, as, for example, to Hondius and Janssonius in the issue of their Atlas of 1633.

The list of works which issued from this famous printing house in so far as we have accurate information, is an exceedingly long one, and the titles include many which do not touch upon matters geographical, hence do not call for consideration in this brief sketch. We may, therefore, pass to a more detailed word concerning those works which bear particularly upon geography and navigation, to his maps and globes.

[21] See *Extract uit de Resol. der Staten van Holland en West-Vriesland, 5 Aug., 1608,* given by Baudet, *pp. 156–158.*

[22] See p. 58 for specific reference to some of the many striking similarities, which seem to give conclusive evidence that Hondius borrowed from Blaeu.

It does not seem possible at this date to enumerate all the maps which might properly be called the special work of Blaeu, and it is doubtful if it could have been done in Blaeu's day, since he so often borrowed here a little and there a little which he incorporated in his maps. Reference has before been made to the practice of map makers borrowing one from the other, sometimes more, sometimes less, without credit. Not all of Blaeu's maps are signed, and but comparatively few of them are dated. He did not consider it essential always to employ the same name when affixing his signature. Sometimes he gave his name as Guilielmus Janssonius Blaeu, Guil. Jansz. Blaeu, Guiljelmus Blaeuw; sometimes as Guil. Jansz. Alcmar, Guilielmus Janssonius Alcmarianus; sometimes as Guiljelmus Caesius, or G. J. Caesius, in which, in accord with a practice of the time, he had classicized his name Blaeu; sometimes the name is coupled with that of the son as Guil. et Johan. Blaeu, and on certain maps we find the names J. or Joan. Blaeu, Johannes et Cornelius Blaeu, maps which were wholly or in part the work of the sons, but were drawn after the manner of the father.

Next to his terrestrial globe maps of 1599 and 1602, his oldest known map is that of 1605, here issued in facsimile, and described below. His "Nywe Paskaerte" of 1606, of which but few copies are now known, appears to have been the first which he especially designed for navigators. Baudet gives a somewhat enthusiastic description of a copy of this map printed on parchment, which at the time of his writing was in the possession of Mr. Tiele.[23] It is drawn with the west at the top, having a width of 76 cm. and a

[23] See Baudet, P. J. H. *Naschrift op. Leven en werken van W. Jz. Blaeu, pp. 15–18.*

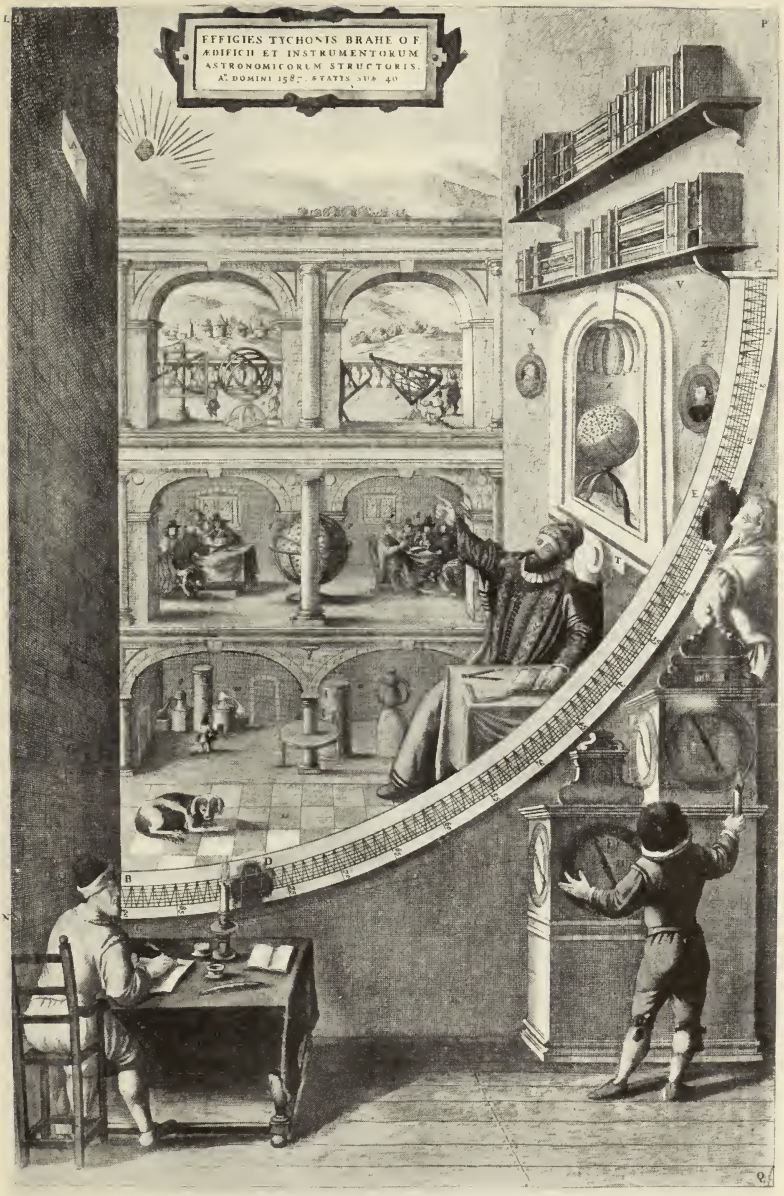
breadth of 59 cm., extending from 25° 30′ to 75° north latitude, or from the Canary Islands on the south to the Beeren Island on the north, from Terceira on the west to and including the Ionian Islands on the east. In a cartouche at the bottom of the map is the following inscription, given here in free translation:[24] "Willem Jansz. to the kind reader: In this map, dear reader, you will find all the sea coasts of Europe carefully drawn by Cornelius Doedsz. of Edam, according to true directions and elevations, except for the Mediterranean, in which the author has purposely omitted the elevations from Malta eastward, and has only given direction, according to our common Dutch compasses, which, in the vicinity of Candia and Cyprus point a little too much toward the northwest, as is shown by the fact that Malta, the south shore of Candia and of Cyprus are all situated in latitude 36°, although it is impossible to reach them sailing west-east, as this map clearly shows." To the right of the above inscription we read: "Ghedruct t' Amsterdam bij Willem Janssoon op't Waeter inde Sonnewijser," and to the left, given here in translation: "Since on account of the limited space the entire Mediterranean Sea could not be given, we have therefore decided, for the use of seamen, to add also the part from the coasts of Barbary, Sicily, and Malta, passing the Grecian Islands, Candia, and Cyprus to the coast of Syria." Of the two small inset maps, one represents the Azores, the other the Beeren Island and the west coast of Spitzbergen. The eastern part of the Mediterranean, Greece and the Ionian Archipelago, the coast of Asia Minor and Syria, have been placed in the Sahara Desert.

[24] The inscriptions in the original Dutch are given by Baudet: *Naschrift, pp. 16–17.*

Longitude is not indicated, but latitude is given on the border, each degree being divided into thirds. In this map northern Europe is brought too far to the west, and, in accord with the general representations of the time, the Mediterranean is given too great an extent in longitude. The errors in latitude are comparatively insignificant. As one of the first examples of the work of Blaeu's printing house, it is deserving the special mention given above, particularly so by reason of the distinctness of its boundary lines, the excellent form of its letters, and the care with which geographical details have been indicated.

A resolution of the States General dated April 25, 1608, gives us the information that to Willem Jansz., map maker of Amsterdam, the sum of 200 gl. is to be given for the dedication and presentation of a book of sea charts, entitled "Het Licht der Zeevaert," which lays down the coasts and harbors of the Western, Northern and Eastern Seas. In this we appear to have first reference to Volumes I and II of an important work by Blaeu, of which work a third volume appeared in 1621, protected by an octroi of the States General for six years, expressed in a resolution bearing date August 13, 1618.[25] This resolution of the States informs us that to Willem Jansz., a citizen of Amsterdam, an octroi is granted for the period of six years, to make, print, and publish in the United Netherlands, the third part of his book entitled "Het Licht der Zeevaert," containing a description of the sea-coasts of the Mediterranean Sea. Copies of the first two volumes, printed in accord with the indication contained in the resolution referred to above, that is, in 1608, appear not to be known, but there exists a French edition of 1619, bearing the title "Le flam-

[25] An extract from the Resolution is given by Baudet, *p. 156.*



Interior of Tycho Brahe's Observatory at Uranienburg
From Le Grand Atlas

beau de la navigation . . . Chez Guilliaume Jeansz. demeurant sur l'eau, à l'ensigne du Solaire Dore. l'An 1619," which title is often found in the volume pasted over an original Dutch title dated 1620. In translation this Dutch title, being practically the same as that in French, reads, "The Light of Navigation in which are plainly drawn and described all the Coasts and Harbours of the Western, Northern, Eastern and Mediterranean Seas. Also many countries, islands and places of Guinea, Brazil, East and West Indies. Partly taken from the works of the best writers on marine matters [as Lucas Jansz. Waghenaer and others] but improved through the writings of experienced seamen, and by making use of their statements and explanations; enlarged by many new descriptions and maps. All divided into four books, each volume having its own index. Hereto have been added [besides a course in the art of navigation] new tables of the declination of the sun, derived from the observations of Tycho Brahe, and calculated from the meridian of Amsterdam. Also new tables and instructions in the right use of the Pole Star and other Stars, for the benefit of all navigators." In 1627 the Dutch edition seems to have been issued by "Jan Janssoon wonende op 't water," the first part being dated 1626, and the second part dated 1625.

In the dedication of his third volume to the States General and to Prince Maurice, a dedication dated September 1, 1618, there is to be found a statement by Blaeu which shows his own opinion of the importance of the first two volumes. He writes he is "assured without boasting that this third volume will be as useful as the two preceding, containing the description of Eastern and Western Navigation, of which Your Honorable Body [States General]

and Your Excellency [Maurice] at other times have had sufficient proof from trustworthy certificates of well known navigators, and also from the statements of the famous pilot Lucas Waghenaer." To have from Lucas Jansz. Waghenaer a favorable criticism concerning a work which was destined to be considered superior to his own, is of no little importance. Blaeu further acknowledges in his introduction the influence of Willem Barentszoen's maps upon his own, for he states "to the kind reader" that "we have for some years past collected very carefully all observations and plans, by means of which we have improved and enlarged in many respects the descriptions of Willem Barentsz., whose writings have been of much value to us in this work. Besides, we have added the descriptions of all the sea-coasts in the east which were not laid down by him, as of the islands of Candia, Cyprus, the coasts of Syria and Egypt, and also of the Greek islands; and how one in this way can sail even to Constantinople; and we have put this all together." "The uses of this Book" he sets forth in six brief introductory chapters, in which he treats of "1—The difference between the Dutch and the Italian marine maps; 2—Why the compass needle is not laid directly under the compass lily; 3—Why the marine charts of the Mediterranean Sea are not drawn showing the degrees of latitude; 4—How to reckon latitude; 5—How the declination of the compass needle or the variation of the compass may be determined; 6—How to find the elevation of the sun from its shadow."

Blaeu's reference to the declination of the needle in this introduction is of considerable scientific importance and interest. In his day the compass makers found the needle's declination for Holland to be from about 7° 45′ to about

8° 26′ eastward. They were, therefore, accustomed to lay the compass lily a corresponding number of degrees to the left or westward from the direction in which the needle pointed that this lily might turn to the true north. He found that in the Adriatic the declination of the needle was 0, and that in the Italian compasses the direction of the needle and of the lily agreed. Compass roses on Italian portolan or sailors' charts, therefore, indicated no declination as the Italian compasses indicated none, and the compass lily simply marked the true meridian. As distances to be sailed in the Mediterranean were not great, latitude, therefore, was not laid down, and longitude was omitted, by reason of the fact that there was no accurate method of determining the same, consequently vessels sailed from port to port directed only by the compass. Blaeu wrote that "since the skies are there [in the Mediterranean] almost always clear, and the land high, and places are not far distant one from another, one losing sight of one part of the coast will be in sight of another part, and the majority make very little use of latitude. The seamen and those who have navigated these parts have not taken into consideration the latitudes, and follow only general direction." This being Blaeu's observation, which is practically taken word for word from Barentszoen's introduction to his "Caertboeck," one would not, therefore, expect to find either parallels or meridians laid down on his maps. He gives only compass roses and direction for sailing in accord with the Dutch compass. On the maps of Barentszoen, which maps Blaeu closely followed in many respects, the directions for sailing are given in accord with the Dutch and with the Italian compasses. Blaeu could not have followed a better master in plan and purpose, and while not

always indicating just what he borrowed, he seems to have been inclined to give adequate praise to the work of his predecessor. It cannot be without interest to cite here a brief word from Barentszoen's introduction to his "Caert-boeck," as indicating his spirit and method. He says "that not only being urged by my many good friends, but also feeling inclined myself to do so, since I always have been accustomed from my boyhood up to draw as many maps as I found it possible to draw of the countries which I visited, or around which I sailed, giving the seas, the waters and the directions, I have decided to publish certain maps of the sea-coast of the Mediterranean Seas [which I have collected for some years past] into book form, for the use and the benefit of all navigators, and persons interested in navigation. In part, I describe what I myself have seen on my journeys, in part what I have learned from other experienced navigators and pilots, who have sailed through the Strait of Gibraltar to Italy and the surrounding countries. And this I have carefully arranged, showing all harbors, roads, bays, courses and directions; giving myself a great deal of trouble, and incurring a great deal of expense. Since I did not like to rely alone upon myself, I invited to my home several seamen and pilots, who sailed the Mediterranean Seas, with whom I have communicated about my work. I made corrections whenever I found that their observations had been more exact than my own, that it might not seem as if I, being proud, intended to make a name for myself, and as if I had done this work carelessly, but that it should be clear I had gone to much trouble."

A resolution of the States General, dated March 9, 1623, granted to Willem Jansz. Blaeu, for a period of ten years, the exclusive right to print and publish a work referred to

in the resolution as "een compendium van den Zeespiegel." It appears, however, that this was not issued until 1625, and under the title "Tafelen van de declinatie der Sonne, ende der voornaemste vaste sterren, Mitsgaders van 't verscheyden gebruyck der Noordsterre Nieulycx, allen Zeevaerenden ten dienst, ghecalculeert door Willem Jansz. Blauw," or "Tables of the declination of the sun and of the most important planets with the different uses of the North Star calculated anew for the use of all navigators by Willem Jansz. Blauw." On the title-page appears a representation of the cross-staff and the astrolabe, with the imprint "t' Amsterdam By Willem Jansz. Blauw in de gulde Sonnewyser, Met privilegie, Anno 1625." The statement is made in the preface that "from the exact observations of Tycho Brahe, we have calculated new tables of the declination of the sun." These same tables are to be found in the Zeespiegel of 1627, and were intended to replace the old tables of the "Nieuw Graetbouck" of the year 1605.

A second privilege granted by the States General, dated March 9, 1623, as the preceding, gives us the first word concerning another work by Blaeu intended especially for the use of seamen. This work, apparently not issued until the following year, though a copy dated 1624 does not seem now to be known, bears the following title taken from the issue of 1627: "Zeespiegel, Inhoudende een korte Onderwysinghe in de Konst der Zeevaert, en Beschryvinghe der Seen en Kusten van de Oostersche, Noordsche end Westersche Schipvaert. Wt ondervindinghen van veel ervaren Zeevaerders vergadert, en t' samen ghestelt. Door Willem Jansz. Blaeuw Tot Amsterdam. Ghedruckt by Willem Jansz. Blaeuw, in de vergulde Sonnewyser

1627. Met Privilegie voor thien Jaren"; or, "Mirror of the Sea, containing brief instruction in the art of Navigation, and a description of the seas and coasts of the Eastern, Northern and Western Navigation. Collected and arranged from the experiences of numerous Navigators. By Willem Jansz. Blaeuw, At Amsterdam. Printed by Willem Jansz. Blaeuw, in the gilded Sun-dial, 1627. With a privilege for ten years."

Blaeu figures his declination tables from the years 1624, 1625, 1626 and 1627, on a parallel of the earth from the meridian of the west point of England, since this longitude was most frequently used by the Dutch navigators in sailing the Channel, as well as in sailing the coasts of France, Portugal or Spain. The work is divided into two parts, the first being a short treatise on the art of navigation, and the second a collection of maps or sea charts. We have in this work a striking illustration of the lingering influence of Ptolemy, for he takes as a basis of many of the ideas he presents the work of Ptolemy. The book does not undertake, as Baudet points out, to add to or improve the methods of defining geographical location. It does not undertake to correct what were the known errors in his day. He treats in his first part of the several spheres; he presents what he considers to be acceptable proof that the earth is in the center of the universe, as the stars appear at all times to be of the same size, in whatever part of the heavens they may be; he explains the construction and the use of the cross-staff by means of which the observer determines the altitude of the sun; he points out that in determining latitude by observing the altitude of the Pole Star, 2° 42′ should be taken as the distance from the star to the pole; he discusses the subject of atmospheric refraction,

basing his observations on those of Tycho Brahe, which discussion is of special interest since it sets forth the attitude of seamen of that day toward this subject, and the difficulty they had in meeting it by reason of the imperfect instruments with which they made their calculations.

Blaeu's charts are drawn on a plane or cylindrical projection, although the projection of Mercator had been known for more than half a century. This fact seems to suggest the idea that in publishing his book he had not so much in view the question of the advance of the art of navigation as to meet a desire for a work in agreement scientifically with the knowledge of seamen of his day. In point of accuracy, Blaeu's charts in this work are wanting much, but we must not forget the imperfect methods employed in his day for obtaining geographical location. If accuracy was wanting in the land maps, much less could we expect to find accuracy in the marine charts. Seamen in part were accustomed to estimate longitude and distance from change in latitude, and the direction in which they sailed. The speed of a ship was often estimated from the size and the number of sails used. It was not until about the middle of the seventeenth century that the log was brought into common use, consequently Blaeu makes no reference to it. It is interesting to note that a somewhat similar instrument was employed about the middle of the sixteenth century for measuring the angle which the axis of the ship made with its track as observed on the surface of the water. In his "Spieghel der Zeevaert" of 1584, Waghenaer states that for measuring this angle, "it is necessary to let the plumb line log behind with a piece of wood attached or otherwise." A comparison of the maps of Blaeu with those of his distinguished predecessors, Lucas

Jansz. Waghenaer and Willem Barentszoen, warrants our assigning to him first place, both in point of execution and in the nearer approach to correctness in his drawing. John Blaeu, in his Atlas of 1664, referring to the maps of Waghenaer and Barentszoen, says that "my late father not only greatly improved both of these, but also enlarged them for the benefit of navigation, adding to them so much that was lacking that his may justly be called a new work."

In 1646, John Blaeu printed a fourth part of the Zeespiegel, bearing the title "Vierde deel der Zeespiegel, inhoudende eene beschryvinge der See-havenen, Reeden, en Kusten van de Middelandsche Schipvaert. Uyt ondervindingen van vele ervaren Zeevaerders by een vergadert, en t' samengestelt, door Willem Jansz. Blaeu, t' Amsterdam. Gedruckt by Johan Blaeu, op 't Water, in de vergulde Zonnewyser. 1646," or "Fourth Part of the Mirror of the Sea, containing a description of the Harbors, Roadsteads, and Coasts of the Mediterranean Navigation. Collected from the experiences of famous Navigators, and arranged by Willem Jansz. Blaeu at Amsterdam. Printed by John Blaeu on the Water in the gilded Sun-dial, 1646." There is included in this fourth part the third part of the "Licht der Zeevaert" of 1621, with the arrangement of the contents and the size of the volume somewhat altered. That which is true of certain map publishers in this day, in their attitude toward their own publications, was true of the publishers of these Willem Blaeu maps after his death. So long as there were publishers for them, it was not thought to be necessary to improve them, especially so since John Blaeu, who had succeeded his father in charge of the business, had taken up what he thought to be more profitable printing than the issue of charts for seamen. Other pub-

lishers, after the middle of the century, were entering the field, and the Blaeu marine maps in course of time came to be regarded as obsolete.

What we may call his first Atlas of land maps appeared in 1631, with the title "Appendix Theatri Ortelii et Atlantis Mercatoris." It contains maps which had been previously issued, some by himself, many by other map makers, while in numerous instances he left it difficult to decide both date and origin. We know that as early as 1605 he was issuing maps and charts in single sheets, following the example of Ortelius, Mercator, Judeus and others. Baudet, it may be noted, expresses himself as being unable to decide whether the World Map of 1605, referred to in the resolution of the States General of the 23d of April of that year, was of this character, not knowing of the existence of a copy of the map here reproduced in facsimile from that belonging to the Hispanic Society of America. "My belief," he says, "is that the World Map of 1605 is the Nova totius terrarum orbis geographica ac hydrographica tabula, auct. Guiljelmo Blaeuw," according to Mercator's projection, to be found in the "Toonneel des Aerdrycx."[26] Not unlike Ortelius, Blaeu often selected for addition to his own original land maps the best which he found it possible for him to use, redrafting them on a scale to fit his own Atlas. In general, he greatly improved

[26] Baudet says: "I am unable to determine whether the *World Map* of 1605 and the *Mappa Mundi,* in two hemispheres, of that year, as referred to in the resolution of the States General, are the same. I believe, however, that the *World Map* is the 'Nova totius terrarum orbis geographica ac hydrographica tabula, auct. Guiljelmo Blaeuw,' drawn according to Mercator's projection, to be found in the 'Toonneel des Aerdrycx.' It is not dated, but apparently was printed from a plate which had been used in 1606, though improved somewhat, but from it the date had been erased, which however, according to Lelewel, is slightly visible "on some copies." See Baudet, *pp. 85–86.* The "Nova totius terrarum" is reproduced, p. 52.

their character by his own re-engraving, giving as maps of superior excellence in line, in letter, and in ornamentation. He was not unmindful of the high favor in which the Atlases of Ortelius and of Mercator were held. He, therefore, shrewdly calls attention to their work by giving to his own a title which suggests a connection, though in fact he was scarcely justified in calling his Atlas an Appendix to Ortelius and Mercator. This Atlas of 1631 contains one hundred and three maps, with text in Latin usually printed on the back of each. Seven of his maps are dated, twenty-seven have the names of the original maker, and many of them are signed Guilj. Blaeu, G. J. Caesius or Guiljelmus Janssonius et Joannes Blaeu.

He begins his preface with much praise of Ortelius and Mercator, observing that Mercator died untimely for his work, after finishing Europe except Spain, and he assumes it as his task to publish an Appendix to the Atlases of these great men. He states that his Atlas will contain maps of countries already drawn by them, but he promises to improve them. That he did improve not a few of them is made evident by a close comparison, yet he left many features uncorrected, which easily could have been brought to date.

He often intimated to his friend, W. Schickard, his ever present desire to improve his maps, in which references we find the first promises of his work issued in 1634 under the title "Toonneel des Aerdrycx." In a letter dated Amsterdam, November 22, 1633, he tells his friend of his preparation for this new Atlas,[27] expressing the hope that he would be able to complete the first part during the winter, and accepting from him an offer for a new map of Wür-

[27] See Baudet, *pp. 96–98,* for extracts from his letters to Schickard.

temberg, for which he was ready and willing to pay the price asked. This map he thought would add much to his maps of Germany. December 6, 1633, he writes again to Schickard: "The esteemed gentleman, Hugo Grotius, has informed you that I am planning a new Atlas, and that a considerable part of it is already completed, in addition to my Appendix Theatri Ortelii et Atlantis Mercatoris, which has been published, so that I will be able to issue yet this winter two parts of reasonable size, one part of which will contain maps of upper and lower Germany, and as I should like to add this map of Würtemberg which you have drawn, and which you have promised me, I therefore wish to postpone the publication a little longer. You write that this map of Würtemberg which you have drawn on twenty sheets can be reduced to four of common size. If, however, you deem it better to make use of more sheets, you may follow your pleasure. Whatever your decision, I will pay the price which you ask for it." On January 12, 1634, Blaeu writes Schickard again: "I am pleased to learn you agree with my opinion in regard to the number of maps. It is my intention to place two or three provinces on one sheet, but it will be necessary, however, to leave some open space in which I can write the titles of the maps, arms of the country, and the scale of miles. Do not let this worry you, however, but follow the divisions which are most easy for you. In the case of maps so carefully drawn, it seems to me the larger the number, the better it will be. Forests, buildings, etc., may be but roughly marked. If you will give the size and exact location, I will take care that the emblematical figures are properly represented"; and he adds that "in order to make sure that the completed work is well done, I shall let you correct the plates one at a

time." Somewhat later Blaeu writes again that "I shall give especial attention to the engraving of the plates, printing lightly from them at first, in order that changes may be made before the final engraving is done. . . . Take as much time as you may need, and in case you are unable to finish them during the summer, you may also have the winter." June 24, 1634, he writes to Schickard: "I have published the first part of my Atlas, containing one hundred and sixty maps, with descriptive text in German, translated from Latin. In the Fall I shall publish the Latin, French and Dutch texts," these titles being, respectively, "Theatrum Orbis Terrarum," but dated 1635; "Le théâtre du monde ou nouvel atlas," but issued in 1634; "Toonneel des Aerdrycx," 1634. The arrangement and number of maps in the several issues do not agree, but in the main features they are the same. The "Toonneel" may be considered an enlargement of his "Appendix" done in practically the same manner, but with the addition of numerous details, and ornamented with additional illustrations. That he borrowed from the "Nieuwen Atlas" of Joannes Janssonius and Henricus Hondius becomes evident in a comparison of the descriptions of "Germany," the "Netherlands," and of certain other parts.

The "Appendix" and the first two parts of the "Toonneel," published by Willem Blaeu and his son John, may be regarded as the beginning of the large Blaeu Atlas first issued in 1662 in eleven volumes, a work of unsurpassed excellence; indeed, we may refer to it as the foremost atlas produced by the great Dutch atlas makers of the seventeenth century. Its completion and issue, after the death of the father, Willem, places it therefore without the scope of this sketch, yet as he had contributed so much to insure

its success by his own early activities, a word of reference to it is here fitting. Editions of this work appeared in rapid succession in the Dutch, the French, the Latin and the Spanish language, the number of volumes being either nine, ten, eleven or twelve in each edition, varying otherwise but little in the essential features. As numerous copies of the work were printed in each edition, it is therefore not a publication which can be called rare even in this day. Most of these editions were printed from the superior type and copper plates of the Blaeu printing house, and on paper of fine quality; some were issued in costly bindings, having their maps, coat of arms and emblems of states and of royalty exquisitely colored. Copies of the atlas were especially prepared for rulers and for statesmen of renown. We are informed that to Admiral de Ruyter an especially fine copy was presented after the two days' battle of 1666, and that in the name of the States General a copy bound in royal purple was presented to the Sultan Mohammed IV, with which he was so well pleased that he ordered its translation into the Turkish language.

In Blaeu's day globes were held to be of the highest value as aids in the study of geography and astronomy.[28] Seamen engaged in transoceanic navigation counted on a terrestrial and a celestial globe as essential to a navigator's complete outfit of instruments, and as Blaeu was especially desirous of making his scientific knowledge serve the cause of navigation, it was but natural that he should turn his attention to globe making.

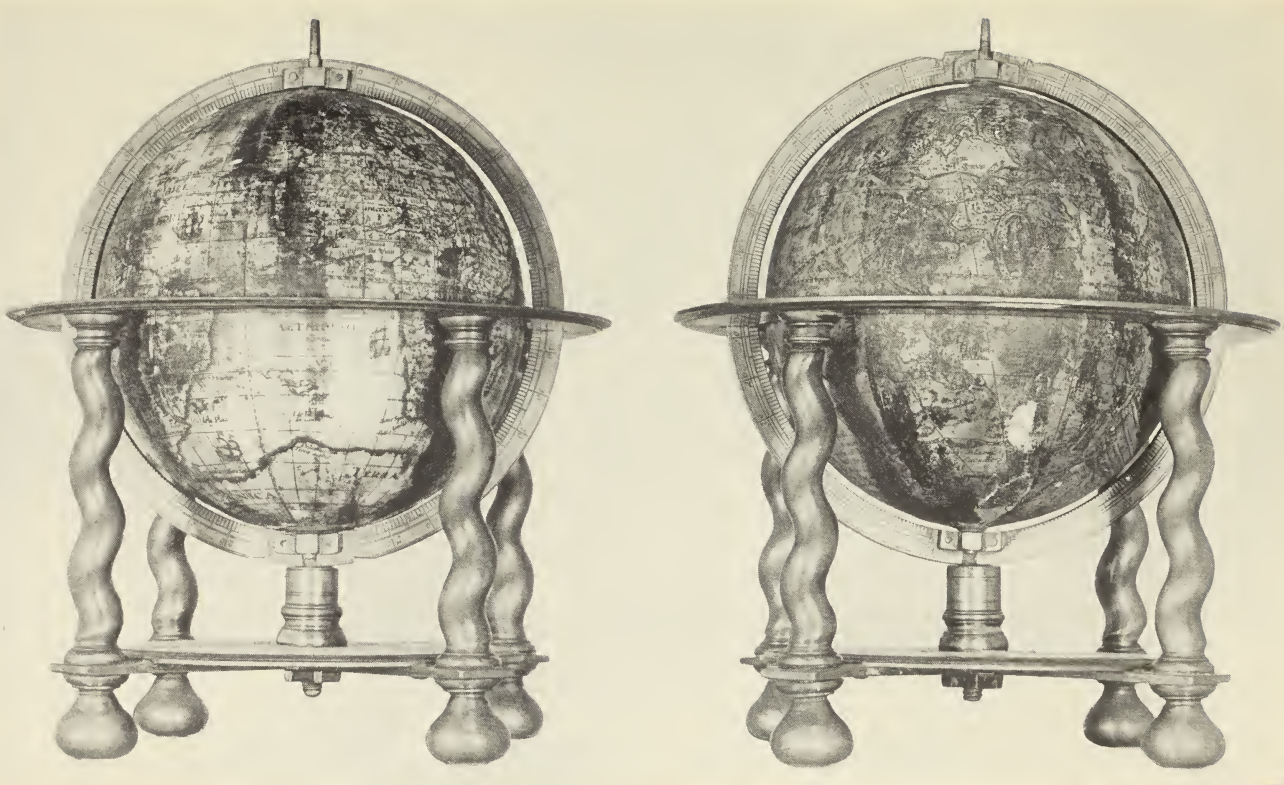
[28] See Fiorini, Matteo. *Sfere Terrestri e Celesti di autore Italiano oppure fatte o conservate in Italia. Roma, Presso la Società Geografica Italiana, 1898;* Günther, Sigmund. *Erd- und Himmelsgloben, ihre Geschichte und Konstruktion, nach dem Italienischen Matteo Fiorinis frei bearbeitet. Leipzig, 1895.*

Among those skilled in the art of globe construction in the late sixteenth and the early seventeenth century, the Low Countries could claim such distinguished men as Gerhardus Mercator, Jacobus [Florentius] van Langren and Arnoldus [Florentius] van Langren, father and son, Jodocus Hondius and Guilielmus Jans. Blaeu, and none of these was more skilful than the last named. Both for the number constructed and for the quality of the work, his globes are cartographical and astronomical treasures of the first value.

The oldest known terrestrial globe extant is that constructed by Martin Behaim of Nuremberg in the year in which Columbus made his first momentous voyage across the Atlantic.[29] It is a manuscript globe, that is, a ball covered with irregular strips of parchment on which the world map has been drawn by hand and elaborately colored. In the first decades of the sixteenth century, numerous globes were made either of copper on which the map was engraved, of wood, or of a composition on which an engraved or hand drawn map was pasted. Some of these globe maps, as for example that attributed to Martin Waldseemüller and supposed to have been drawn in the first decade of the sixteenth century, hence the oldest known of this character, were engraved and printed on gores or bi-angles, and were so fashioned mathematically that they would completely cover a ball when pasted over its surface,[30] but not until Mercator, in 1541, engraved and printed his famous globe gore map can such a method be said to have proved itself to

[29] Ravenstein, E. G. *Martin Behaim; his life and his globe. London, George Philip & Son, Ltd., 1908.* Contains a facsimile of the globe printed on four sheets.

[30] Fischer, Jos. S. J. and Wieser, Prof. Franz V. *The Oldest Map with the name America of the year 1507 and the Carta Marina of the year 1516 by M. Waldseemüller (Ilacomilus), Innsbruck, 1903.* *See p. 14.*



Terrestrial Globe and Celestial Globe, 1616. Willem Janszoon Blaeu

be thoroughly practical. From this time on, with now and then a slight modification of the number of gores employed and of the method of fitting them on the ball near the poles, globes have been constructed in much the same manner as Mercator had constructed his first example. That he made many globes is very certain, yet it appears that all of these were long thought to have been destroyed, until about forty years ago, when a complete set of his gores was found, and at present no less than six others, either mounted or unmounted, can be located.[31] In 1551, Mercator prepared in the same manner a celestial globe map, all examples of which likewise had been thought to have disappeared until the discovery of the set referred to above, and of this globe a number of copies are now known to exist.

Quite as successful as Mercator were the van Langrens, father and son, the first globe of the father dating as early as 1585.[32] Before the close of the sixteenth century, Jodocus Hondius became interested in the construction of globes, and, like the van Langrens, continued his work in the first decade of the following century, his workshop then falling into the hands of his sons, who for many years found the manufacture of globes to be a profitable business.[33]

Blaeu, as before stated, must have obtained much of his early knowledge of map and of globe construction while a pupil of Tycho at the Castle of Uranienburg, for it was not long after his return to Amsterdam that we find him actively engaged in this work, perhaps in his own work-

[31] Van Raemdonck, D. J. *Les sphères terrestre et céleste de Gérard Mercator [1541–1551]. Notice publiée à l'occasion de la reproduction de ses sphères à l'aide de facsimile de leurs fuseaux originaux, gravés par Mercator et conservés à la Bibliothèque Royale à Bruxelles. Saint-Nicolas, 1875.*

[32] Fiorini, *op. cit., pp. 192–199.*

[33] Fiorini, *op. cit., pp. 262–272.*

shop.[34] His first globe is dated 1599. The world map here represented is, so far as we have definite knowledge, his first cartographical publication, and in many of its features it gives evidence that Mercator was the master followed, notably in the representation of the loxodrome lines which radiate from the wind or compass roses, or from the centers regularly placed on the surface of the globe. It has a diameter of 34 cm., which is less than that of Mercator's globe of 1541 but greater than that of van Langren of 1585. The gores, twelve in number, have been cut seven degrees from each pole, the polar space being covered with a circular disc. Blaeu, as many other globe makers of his period, found that by thus dividing the engraved globe maps a more nearly perfect covering for the ball could be obtained. Meridians and parallels are drawn at intervals of ten degrees, the prime meridian crossing the island of Santa Maria in the Azores group. In conspicuously placed legends he presents his address to the reader, that is, to the one who may have occasion to make use of his globe, a dedication to the United Provinces of the Netherlands, which, like the first, is signed Guilielmus Janssonius Alcmariensis, and in separate inscriptions he calls attention to the great discoveries and explorations as, for example, those of Christopher Columbus, of Amerigo Vespucci, of Ferdinand Magellan, of Gaspar Cortereal, and of the Dutch navigators, with a brief mention of others. All legends are in Latin except those referring to the discoveries of his own countrymen in the far north, in which he has employed the Dutch language.

As in the issue of his sheet maps, Blaeu was not always careful to add an exact date, in the majority of instances

[34] Fiorini, *op. cit., pp. 229–262.*

omitting the date altogether, so in the issue of his globes he either omitted the date or frequently gave one later than was that of the original issue. His geographical records serve us, however, as very accurate guides in the determination of dates, and what was so frequently true of the globes he constructed in the last years of his life was true of this, his first. We have, for example, one fine copy of his work, bearing date 1599, which contains geographical records of 1616, indicating, therefore, a late reprint with a few alterations.

Three years later, that is, in 1602, Blaeu issued a terrestrial and a celestial globe, each having a diameter of 23 cm. He refers to his terrestrial globe as an improvement upon that of 1599, referring doubtless to its geographical details and not to its size. He dedicates his work to the three provinces, Holland, Zeeland and West Friesland, calls especial attention to the recent expedition of Olivier van der Noort, the course of whose expedition around the world he lays down on his map, and signs himself Guilielmo Jansonio Blaeu, substituting his family name for the name of his birthplace. On his celestial globe of 1602 he located the stars in accord with the reckoning of the year 1600, making use, as he states, of the observations of his friend and teacher, Tycho Brahe, but for the southern constellations the observations of the explorer Fredrik Houtman.[35] By reason of the fact that so few copies of these globes of 1602 are known to exist, it has been thought that for some reason Blaeu issued a very limited number. We know, however, that his terrestrial globes were highly valued and much in demand, because of the care with which they had

[35] Fredrik Houtman, astronomer and navigator, sailed with his brother Cornelius Houtman to the East Indies in the years 1599 and 1600.

been prepared, because of his effort to give information concerning the latest discoveries, and because of his representation of the loxodrome lines which made them of special service to navigators; that his celestial globes found favor by reason of the fact that he was known to be a pupil and friend of Tycho Brahe; and that he himself was known to be a mathematician and astronomer of distinction.

In 1603, he undertook the preparation of a celestial globe to be considered a companion of his first globe of 1599. From the observations of Brahe and of Houtman he tells us as in his work of the preceding year, that he derived many of his details, and he honors the former by giving his portrait a conspicuous position in his map, adding his master's favorite motto: "Non haberi, sed esse."

The Hispanic Society of America possesses a fine example of Blaeu's early globe work. It is small in size, having a diameter of 13 cm., and is well preserved. Near the upper part of North America is the legend inscribed in a neat cartouche, "NOVA et accurara Terra marisq; Sphera, denuo recognita et, correcta á Guilielmo Blaeu," and in a second legend placed to the south of "Nova Guinea," which is represented as a part of the great south polar continent of "Magallanica," he inscribes his name with date, "Guilielmus Blaeu Anno D. 1606." There may likewise be found in this Society's rich collections a terrestrial and a celestial globe by Blaeu which clearly are companion pieces and which appear to be unique, the latter dated 1616, the former undated.[36] These globes have a diameter of but

[36] Baudet quotes an interesting resolution of the States General, dated December 10, 1616: "Opte requeste van Willem Jansz., haere Ho. Mo. gededicceert hebbende eenen aertscloot van grooter formen, inhoudende die deelen des aertsbodens, die tot dese tyden toe ontdeckt ende bekent gemaect syn, mitsgaders eene hemelsche sphera van gelyche groote, is den suppliant voor deselve dedicatie toegeleet vyftich guldens eens." *See p. 156.*

10 cm., a substantial and artistic mounting of brass, including meridian circle, horizon circle, four twisted support columns and a circular base plate. In geographical and astronomical details they are remarkably full, a fact especially noteworthy when their size is taken into consideration. The first he designates as "NOVA ORBIS TERRARVM DESCRIPTIO" and adds to this merely the name "Blaeu"; the second he calls a "Sphaera stellata," and in a legend he honors his teacher Tycho Brahe by making special mention of his name, signing himself "Guilielmus Blaeu Auctor excudit 1616." Fiorini refers to a Blaeu celestial globe in the Barberini Palace at Rome dated 1616, but his description of the same shows conclusively that it is very different from the one referred to above, and he appears to consider its map a print of later date, though perhaps in its main features it was originally engraved in the year designated.

The next dated and signed globes of Blaeu appear to be of the year 1622, numerous copies of which the author has been able to locate, but in which, however, slight variations appear. From this time until his death in the year 1638, our globe maker seems to have applied himself most diligently to this work, the globes of his later years being much larger than were those of his early years. This Society possesses a well preserved example of his 1622 terrestrial globe which has a diameter of 69 cm. Its map gives us excellent proof of Blaeu's superior merit in this field. Its geographical details are most numerous, making it an object of great scientific value. Among the records of special interest, omitting for obvious reasons at this time any extended reference to the work, is the representation

of Manhattan as an island, apparently the earliest on a dated map.

Vossius tells us that in addition to terrestrial and celestial globes, Blaeu also made a planetarium and a tellurium. In the first, the sun is placed in the center of the system, about which revolve Venus, the Earth and the Moon, Mars and Jupiter. The second represents the double motion of the Earth, that is, its daily rotation and its annual revolution. He remarks that nothing like it has been seen since the time of Archimedes. Blaeu himself refers to these instruments in his work first issued probably in 1620 with the title, "Tweevoudigh onderwys van de Hemelsche en Aerdsche Globen," as of value for the study of cosmography. In connection with his description of them, he interestingly observes that the celestial heavens are at least 20,000 times greater in diameter than is the circle of the terrestrial globe's course, and this in his planetarium is 2½ inches. He adds that the diameter of the terrestrial globe's course is 1142 times the celestial globe's diameter.

A very considerable number of his globes, doubtless constructed subsequent to 1622, can now be located, though at the time of writing his biography in 1872, Baudet could find trace of but five or six, including those of earlier date. In a searching study of the history of early globes, it may here be stated that the author of this monograph has now been able to locate no less than sixty Blaeu globes.

WORLD MAP OF 1605

Among the treasures of The Hispanic Society of America may be found a unique copy of Willem Janszoon Blaeu's engraved World Map in two large hemispheres, issued in the year 1605. Stretching across its upper border is the title, "NOVA UNIVERSI TERRARUM ORBIS MAPPA EX OPTIMIS QUIBUSQUE GEOGRAPHICIS HYDROGRAPHICISQ3 TABULIS SUMMÂ INDUSTRIÂ ACCURATISSIMÈ DELINEATA, DUOBUS PLANISPHERIIS GRAPHICÈ DEPICTA À GULIEL JANSSONIO ALCMAR," a title which in its special arrangement and in the form of its letters strikingly recalls the World Map of Jodocus Hondius of the year 1611, which, with Professor Joseph Fischer, the editor of this World Map of Blaeu recently issued in facsimile.[37] Here is a second fine example of Holland's contribution to the cartography of a period particularly rich in this field of geography. Mounted on the coarse linen so frequently used for such purposes at that early day, and attached to a rough wooden frame, it is not a little surprising that it should have come down to us through these many years. The old mounting has not been disturbed for this reproduc-

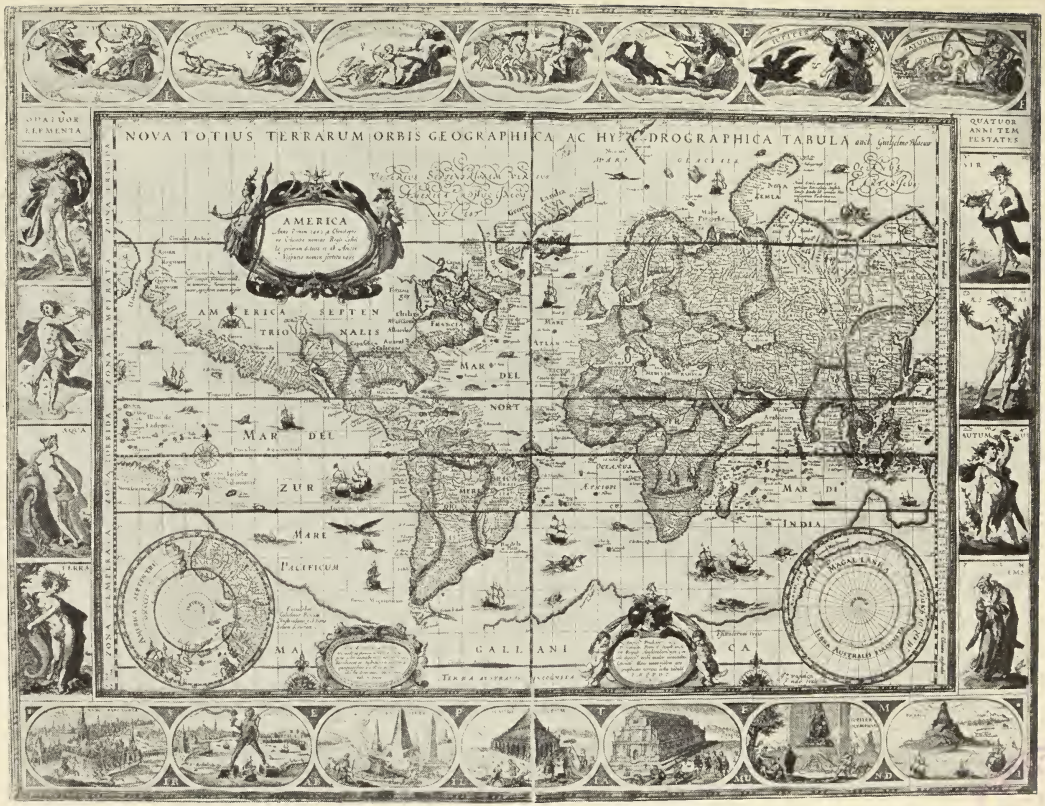
[37] Stevenson, Edward Luther, Ph.D., and Fischer, Joseph, S. J. *Map of the World by Jodocus Hondius, Facsimile in eighteen sheets with text and key plate, issued under the joint auspices of The American Geographical Society and The Hispanic Society of America, New York, 1907.*

tion, and with all of its suggestions of age, it hangs on the walls of The Hispanic Society's Museum amidst other rich cartographical material of the period.

No reference to this great work of Blaeu appears in the literature of cartography, and it seems probable that we have here the only copy extant. In the records of the States General of Amsterdam may be found, however, the entry, "23 April 1605. Is W. Jansz. [Blaeu] van Alcmaer, ende Herman Alartsz, die de heren Staten gepresenteert hebben een grote Werelts Caerte, voor een gratuiteyt toegelegt 25 gl.," and of the same date, "Id. Is W. Jz. van Alcmaer, wonende te Amsterdam, geaccordeert octroy, voor den tyt van 6 jaren etc. te mogen doen drukken ende vuyt geven een groote mappam mundi in twee ronden, by hem yerst uitgegeven." These passages are cited by Baudet in his "Leven en werken van Willem Jansz. Blaeu" without comment other than a very brief word which would seem to indicate that the author had no definite knowledge of the map or maps to which reference is made in the above record.[38] It is altogether probable that we have in these entries a reference to this particular map.

Curiously and somewhat vexatiously, one finds in the reference to the copyright privilege, granted by the authorities, appearing on sheet thirteen, the date "23 April ——," the numbers designating the year wanting because of the injured condition of the map. Some wonder is occasioned by the appearance of the French lilies in the elaborately engraved cartouche on sheets thirteen and fourteen, and by the dedication to Henry IV of France, which reads, "Serenissimo Christianissimo ac potentissimo D. D. Henrico IIII Franciae et Navarre Regi. Domino suo . . .

[38] See note, p. 39.



World Map from Toonneel des Aerdryex, by Willem Janszoon Blaeu

entissimo hanc Universi orbis terrarum Mappam I. M. Q. dat di . . . dedicat." Close examination, however, discloses the fact that both the lilies and the dedication were skilfully pasted on the map after its completion, though by whom and on what particular occasion remain matters of conjecture. The attachment of the coat of arms and the dedication must have occurred before 1610, the date of King Henry's death, and the fact serves at least to fix the time when the map was engraved as prior to that year, or in all probability in 1605.

The map is 244 × 134 cm. in size, including the border. The two large hemispheres, each 116 cm. in diameter, present the world, as then known, in stereographic projection. An ornamental border surrounds it, and all available space outside the great hemispheres and within this border is filled with pictures of cities, rulers in martial array, representations of the typical races of men, while in the angles formed at the top and at the bottom of the map, between the two hemispheres, appear the north and the south celestial hemispheres, each 26 cm. in diameter.

The map is not well preserved, a fact easily recognized in the reproduction. Certain parts, it will be noted, are entirely wanting, having fallen away from the old mounting, but there is little missing that is of the first importance excepting the northwest section of South America, the western Mediterranean lands and portions of the island region southeast of Asia. Though many of the names are illegible by reason of discoloration, it was thought inadvisable to attempt the cleaning of the surface on account of the brittle condition of the old paper. The eighteen sheets in the facsimile, corresponding to the eighteen sheets of the original, together with the key plate much reduced but

showing the entire map, have been printed on a fine quality of Van Gelder hand-made paper. Care has been exercised to have each of the sheets appear in the reproduction as in the original, in so far as has been possible, no attempt being made to remedy defects.

Blaeu's map may be considered a remarkably excellent record of geographical knowledge to date. Most of his striking errors in continental outlines are the common errors of the day. In the Old World, for example, Africa has a breadth of more than eighty degrees, and the east coast of Asia, particularly its northern half, is far from accurate, but he has given us a representation of the extreme northeast section which is superior to that laid down on the large world map of his fellow countryman Hondius. The latter clearly suited his representation to a belief in a perfectly open sea route to China and the distant Orient, showing a great breadth of sea between Asia and America in the region of Bering Strait, while Blaeu has here a fairly accurate record of the geographical features of the region, inserting the name "Streto de Anian." The Mediterranean has much too great an extension in longitude, and is too narrow; the Caspian Sea and the Black Sea have each a strikingly erroneous representation as well as location. The great austral continental land called "Magallanica," in the New World hemisphere, is that which so commonly appears in the world maps of the day. In the New World, North America is made to extend through more than one hundred and sixty degrees of longitude, while South America is given a breadth of more than sixty degrees, and its general outline is not well done, though there is here clearly an improvement over the maps of Mercator and of Ortelius. Blaeu has retained the erroneous repre-

sentation of the "Martin Forbischers Strate" at the southern extremity of Greenland; he includes "Frislandia" south of "Islandia"; "I dos Demonios" east of "Terra de Labrador"; "Brasil" west of "Hibernia al Yrlandia," "As Mann" to the southwest; "S. Brandan" near "C. d. Breton." For the region north of Europe and Asia, the map is especially interesting, making record here of the latest attempts under Willem Barentszoen and other less distinguished explorers from Holland who undertook to find a northeast passage to China before 1605. That part of "Nova Zemla" which was visited is laid down, as are also "Nieuland" and "Beeren Eylandt," the names of all places designated being in the Dutch language, though an extensive legend north of Nova Zemla, calling attention to the efforts of his countrymen to find a northeast passage, is given in Latin, as are all the more lengthy legends. A comparison of the maps of Hondius and Blaeu in this particular region is interesting, the latter preparing his map before the voyage of Henry Hudson, the former making record of Hudson's attempt to sail through this Arctic sea and noting that he had discovered a great ice barrier, "Glacies ab Hudsono detect anno 1608." Finding it impossible to make this passage, it will be recalled that Hudson decided to turn his expedition to the west and the northwest, reaching in due course of sailing the east coast of North America, which he explored in his two voyages from Hudson River to Hudson Bay, losing his life in this great northern sea, which bears his name, in the year 1611. Blaeu has inscribed numerous legends in the northern and northeastern sections of North America, calling attention in one of these to the expeditions of Columbus, Vespucci, Cortereal and Verrazano, in another to the expedition of

Forbischer in 1577, and in yet another to the explorations of Davis in 1585, 1586, 1587. Numerous legends, it may here be noted, appear in different parts of the map, either descriptive of the region in which they respectively appear or calling attention to certain astronomical and geographical questions, as, for example, the lengthy legend on sheets fourteen–fifteen, sheet seventeen and sheet eighteen. In a map of this character one may say the particular scientific and historical value lies in the latest records it contains relative to exploration and discovery. Without giving here the numerous specific references to such events, or to their results as they relate to the expansion of geographical knowledge, it may be stated that Blaeu's map is one of the richest of the period. His geographical names in the Old World alone extend into the thousands, and for the New World those both of coast and of interior are exceedingly numerous.

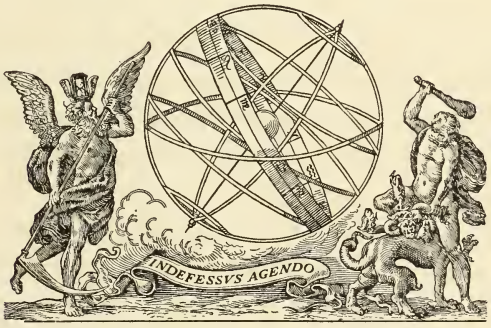
Blaeu has called especial attention to the four distinguished explorers who prior to the time of the issue of his map had circumnavigated the globe, placing their portraits in an elaborate cartouche south of South America and calling attention to their success in a somewhat elaborate legend. The four represented are "Ferdinandus Magallanes," "Franciscus Dracus," "Thomas Candish" and "Oliverus van der Nort," the course of the latter being conspicuously traced on the map, his circumnavigation at this time attracting considerable attention, particularly in the Netherlands. The artistic adornment of Blaeu's map is not its least attractive feature. Its elaborate border, so much of it at least as remains, there being evidence that at both top and bottom much has been cut away, alone gives it almost first place among the fine examples of copper engraving

of the period. On the right and the left we find representations of "London," "Hamburgh," "Mexico," "Cusco," "Dantzik," "Moskow," "Bergen," "Stockholm," alternating with representations of typical people of the earth, such as "Groenlandi," "Chilienses et Peruviani," "Brasilienses," "Moscovitae," "Chinenses et Japonenses." The "Rex Hispania," "Imperator Romanorum," "Imperator Turcarum" and "Rex Chinarum" appear in martial array and are given places of special prominence near the top of the map, while the "Rex Abissinorum," "Rex Persearum," "Magnus Cham Tartarorum" and "Magnus Dux Moscoviae" command in corresponding positions at the bottom. In his representations of the celestial hemispheres he gives special credit to Tycho Brahe and to Frederik Houtman for his information. Parallels and meridians are drawn at intervals of ten degrees, the prime meridian passing through the islands of "S. Michiel" and "S. Maria." Compass roses are numerous, two of these being especially conspicuous by reason of the fact that with them appear the Dutch names of the thirty-two compass points or directions, and the radiating lines serve as loxodrome lines. No less than thirty ships are represented sailing the oceans in all parts of the world, carrying either the pennant of Spain, of Portugal, of Holland or of England. A few of these are curiously interesting, there having been an attempt to fashion them after the manner of the countries to which they belong, as, for example, a Japanese vessel off the coast of Japan, "Navis qua Japonenses utuntur quae illis Champan dicitur," and an open boat in the Pacific near the Strait of Magellan, "Huiusmodi navicularunt forma freti magellaniei accolis in usu est." Sea monsters are numerous, and Neptune is represented in certain parts carrying either a

trident, a pennant of Spain or one of Portugal. Blaeu has not omitted the representation of numerous land animals thought to be native to the regions in which they appear, as in Africa the lion, the tiger, the elephant, the camel, the ostrich, the crocodile; in South America the llama, the alpaca, the monkey, the armadillo, the parrot; in North America the bison, the opossum which is curiously fashioned, the fox and the bear.

Reference has been made to the striking similarity in arrangement and style of the descriptive titles of the Blaeu and the Hondius large World Maps. This similarity is further traceable literally in hundreds of details, forcing upon us the suggestion that Hondius borrowed extensively from Blaeu, since the map of the latter is of the earlier date. To but a few of the more striking evidences of borrowing, however, can attention here be directed. The fact is exceedingly interesting that many of the objects otherwise similarly drawn are reversed in position as represented on the maps. Blaeu turns the faces of his portraits of Magellan and Drake to their left, of Van der Noort and Candysch to their right; Hondius has reversed the position. Most of Blaeu's ships sail in a direction opposite to that in which the ships of Hondius are made to sail, the location of the several ships being, however, practically the same on the two maps; the most ornamental compass roses are placed in identically the same positions; the dedications of the maps and the addresses to the reader are similarly placed in ornamental cartouches, which, however, in the details of their decorations differ slightly; each has a somewhat elaborate representation of the cannibals in eastern South America, but in their details the pictures are reversed. The line of the eclip-

tic passes south of the equator in the western hemisphere, and northward in the eastern hemisphere on the Blaeu map, and this Hondius has reversed; the position of Blaeu's griffin and tiger in the heart of Africa has been reversed by Hondius. Not to extend such comparisons further, it may be stated that a study of the two maps with these similarities, even in minute details in view, can not fail to interest. May there not, therefore, have been good reason for Blaeu's complaint expressed to the States General in 1608? In this, as before stated, he prayed for protection against those who were taking from his work without credit.



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Nova Universi Terrarum Orbis Mappa ex Optimis Quibusque Geographicis hydrographicisqꝫ Tabulis Summa Industria Accuratissime Delineata et Duobus Planisphaeriis Graphice Depicta à Guliel Janssonio Alcmar. Amsterdam, 1605.

It is this unique map which has been here reproduced.

Nieuw graetbouck, nae den ouden styl vuyt de aldercorrecste observaten van den vermaerden astronomo Tycho Brahe, gecalculeert ende gestelt op ten meridiaen deser Nederlanden.

Baudet finds that, from the octroi or patent, this was probably issued in 1605. There does not appear to be a copy of this work extant.

Le Flambeau de la navigation, monstrant la description et delineation de toutes les costes et havres de la Mer Occidentale, Septentrionale et Orientale . . . Par Guilliaume Janszoon. Amst., Guill. Jansz . . . 1619.

Het Licht der Zee-vaert daerinne claerlijck beschreven ende aufghebeeldet werden alle de custen ende havenen vande Westersche, Noordsche, Oostersche ende Middelandsche Zeën. . . . Door Willem Janszoon. Amst., ghedr. bij Willem Janszoon . . . 1620.

Baudet finds that the first and second volumes of this work must have been issued first in 1608, there being a reference to the same in a resolution of the States General of that year.

Tweevoudigh onderwys van de Hemelsche en Aerdsche Globen; Het een na de meyning van Ptolemeus met een vasten Aerdkloot; het

ander Na de natuerlycke stelling van N. Copernicus met een loopenden Aerdkloot. Beschreven door Willem Jz. Blaeu. En gevoeght na de Globen en Sphaeren by hem uytgeven.

Date of original issue is not known; between 1620 and 1669 there were five issues in Dutch, five in Latin, and three in French.

'T Derde deel van 't Licht der Zeevaert, inhoudende de Beschryvinghe der Zee Custen van de Middelandtsche Zee. Byeenvergaedert ende in 't licht ghebracht door Willem Janssen tot Amsterdam by Willem Jansz. op't Water in de Vergulde Sonnewyser Anno 1621.

Baudet finds that the first issue of this was in 1618.

Zeespiegel, inhoudende een korte onderwysinghe in de konst der zeevaert, en beschryvinghe der seen en kusten van de Oostersche, Noordsche en Westersche schipvaert . . . door Willem Jansz. Blaeuw . . . Amsterdam, W. Jz. Blaeuw . . . 1623.

Reissued by John Blaeu, corrected and enlarged, in 1650.

Tafelen van de declinatie der Sonne, ende der voornaemste vaste sterren Mitsgaders van 't verscheyden gebruyck der Noordsterre Nieulycx, allen Zeevaerenden ten dienst, ghecalculeert door Willem Jansz. Blauw. t' Amsterdam. By Willem Jansz. Blauw in de gulde Sonnewyser met Privilegie Anno 1625.

Appendix Theatri A. Ortelii et Atlantis G. Mercatoris continens tabulas geograph. diversarum orbis regionum nunc. prim. editas cum descriptionibus. Amst., apud Guilj. Blaeuw, 1631.

Het nieuwe Licht der zeevaert ofte havenwyser van de Oostersche, Noordsche en Westersche zeen. Amst., W. Jz. Blaeu . . . 1634.

Toonneel des aerdrycx ofte nieuwe Atlas, dat is beschryving van all landen; nu nieulycx uytgegeven . . . Amst., Guilj. et Joh. B., 1635.

Two parts, with third part added in 1642. June 24, 1634, Blaeu wrote to his friend Schickard: "I have published the first part of my atlas, containing 160 maps, with the description in German, translated from the Latin. Next fall, I shall publish the Latin, French and Dutch text."

Theatrum orbis terrarum, sive Atlas novus, in quo tabulae et descriptiones omnium regionum . . . Amst., Guil. et Joa. Blaeu, 1635. 2 vols.

A French edition was issued in 1638; a Latin, Dutch, French and German edition, in three volumes, in 1640; a Dutch edition in 1642; a fourth volume in Latin, Dutch, French and German in 1646; a six-volume edition in 1649–1655.

De groote Zee-spiegel. inhoudende een korte Onderswijsinge in de konst der zeevaert en eene beschrijvinge der seekusten van de Oostersche, Noordsche en Westersche schipvaert enz . . . Door W. Jz. B. Niewelijcx . . . verbetert en vermeerdert. Amst. Joan Blaeu . . . 1655, 1658.

Atlas major sive Cosmographia Blaviana, qua solum, salum, coelum accuratissime describuntur. Amst., Joa. Blaeu, 1662. 11 vols.

A second edition of the first part in 1665.

Grooten Atlas oft Werelt-beschryving, in welcke 't aertryck, de zee en hemel wordt vertoont en beschreven. Amst., J. B., 1664–1665. 9 vols.

Le grand Atlas ou Cosmographie Blaviane. 12 vols. Issued also in the Latin, the Dutch and the Spanish language.

Globes dated:

Terrestrial, 1599	Celestial, 1606
Terrestrial, 1602	Celestial, 1616
Celestial, 1602	Terrestrial, 1616
Celestial, 1603	Terrestrial, 1622
Terrestrial, 1606	Celestial, 1622

Globes undated are numerous. Blaeu's name appears on his globes as Guilielmus Jansonius Alcmariensis, Guilielmus Jansonius Blaeu, Guilielmus Jansonius Alcmarianus, Guiljelmus Blaeuw, Guiljelmus Caesius.

No attempt has been made in the foregoing list to include a reference to all known editions.

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